

Panel Discussion on Neutrino Group Issues

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We were given the following question to start with:

“How much and how quickly should neutrino group effort be shifted from Double Chooz, MINOS and NOvA to LBNE?”

One possible answer:

“We should not divert more than ~30% effort from the experiments we are now building (Double Chooz and NOvA) until the experiment in question has been completely built and has taken beam (not just cosmic) data for 2 years. “

Note: 30% means that is a rough guess; it could be 25% or 35% or ...

-Completely built + 2 years data taking: For Double Chooz that is probably 2014, for NOvA it is probably 2015.

-If we do go with LBNE, we may devote 50% effort in 2016 and ramp up from there.

-If we go with an alternative to LBNE, that issue needs further thoughts.

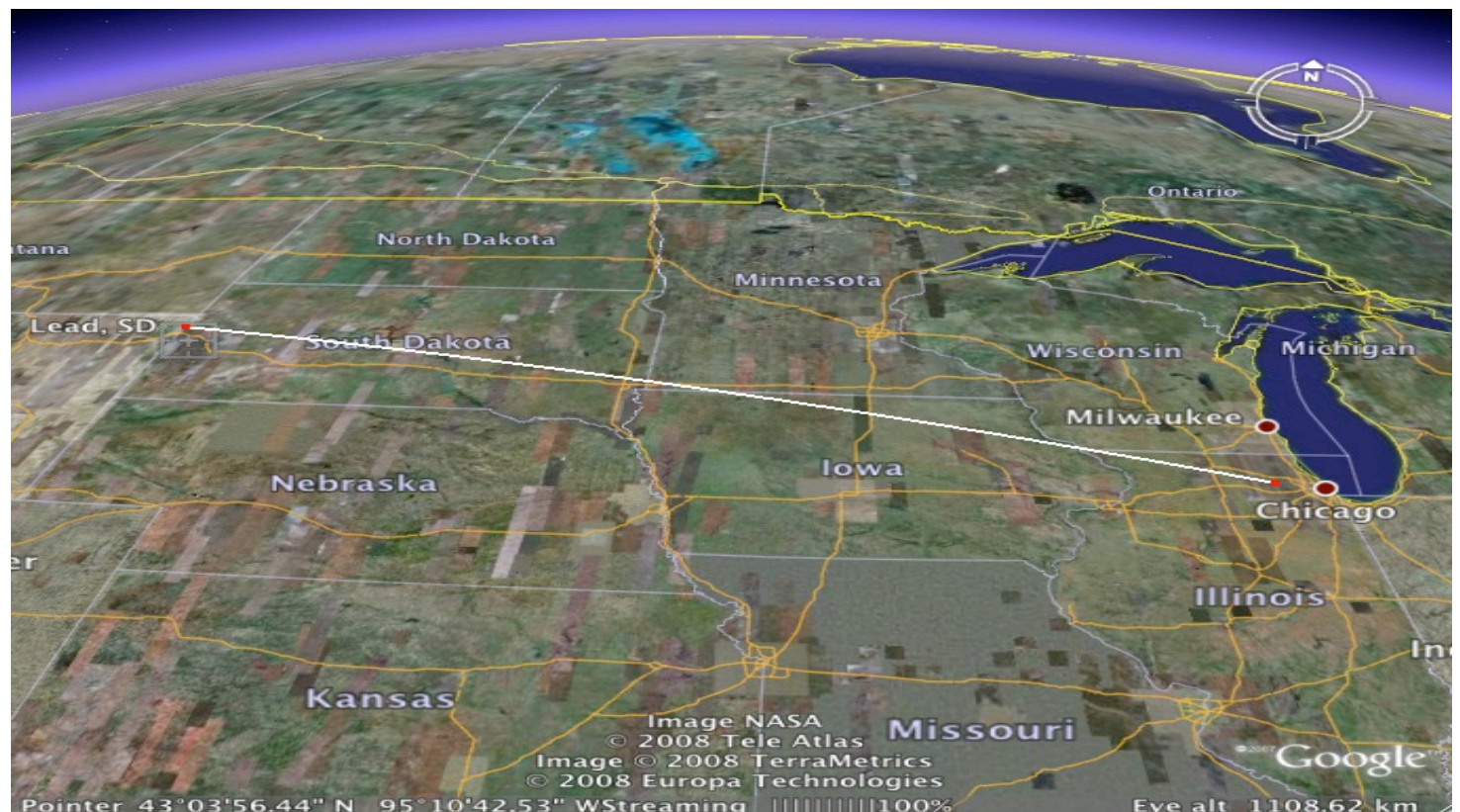
Current group involvement (see Maury's slides for more details):

MINOS → Nearing Completion.

Double Chooz → Far Detector Commissioning, Near Detector Next Year.

NOvA → Near Detector (on surface) Commissioning, Far being built.

LBNE: Long-Baseline Neutrino Experiment = muon neutrino beam and Near detector complex at Fermilab and Far detector(s) located at 1300 km Baseline at DUSEL (Deep Underground Science and Engineering Lab).



LBNE status:

- Currently the detector technology for the far detector has not been decided.
- The options are:
 - Water Cherenkov Detector.
 - Liquid Argon (LAr) Detector.
 - Combination of both.
- Water Cherenkov technology well understood (i.e. successful operation of SK detector in Japan).
- LAr is claimed to have better background rejection/PID capabilities when compared to Water (technology has to be demonstrated).

Possible Timeline for LBNE:

- CD-1 Approved ~April 2011
- CD-2 Approved ~Summer 2013
- CD-3 Start of Construction 2014-2015 (funding dependent)
- Project Complete \geq 2020.

In order to support the discussion we have listed several other question that may arise:

- If we decide to shift more to LBNE, what would be our involvement?
- We have people inclined to both Water Cherenkov and LAr:
 - Should we get involved in both?
 - If not, which one?
- Is this a neutrino group decision or an HEP Division decision?
- Possible involvement with LBNE at this/future time:
 - Water Cherenkov:
 - Front-End electronics. Options include
 - electronics in base
 - electroics in front-end crate
 - low power/wireless
 - LAPD project. Large project at ANL. Could it be large LBNE peoject?
 - LAr:
 - Front-End electronics. Options include
 - front end analog part of electronics for LAr waveform digitizer electronics.
 - Cryostat Design. We might
 - Engineer huge cryostats
 - Outer Veto. Options include
 - mechanical design
 - front-end electronics for outer veto
- Other options?

- If DUSEL is not going to happen (LBNE not cancelled):
 - No Water Cherenkov option in such case.
 - Can the physics be done with LAr detector?

- We should consider alternatives to LBNE in the event it is cancelled.
The alternatives might include:
 - Neutrino-less Double Beta Decay
 - Dark matter searches
 - ...

- Other members of the HEP might be interested in LBNE?
 - Suggestions?